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FIG. 8

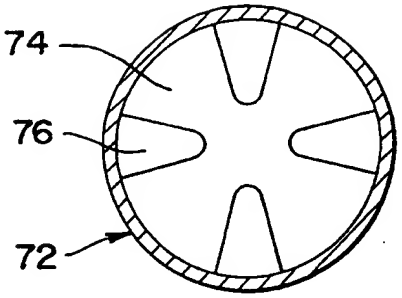


FIG. 9

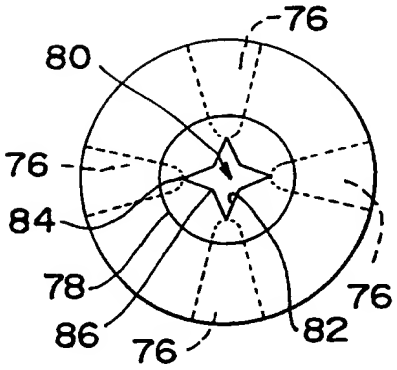


FIG. 9A

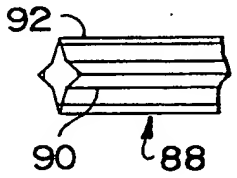


FIG. 10

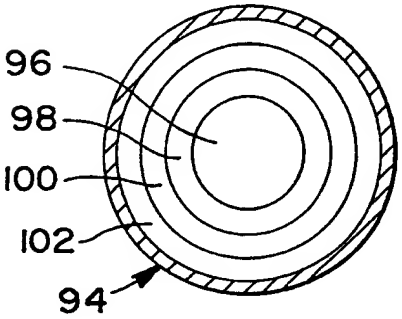


FIG. 10A

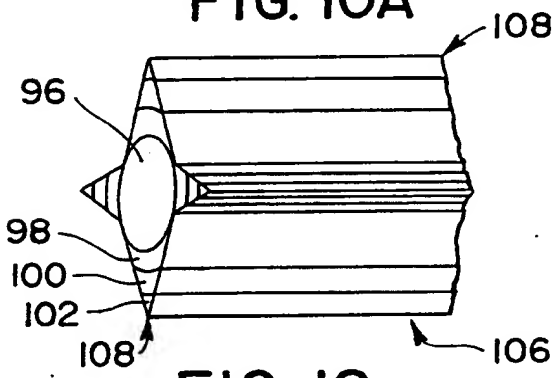


FIG. 11

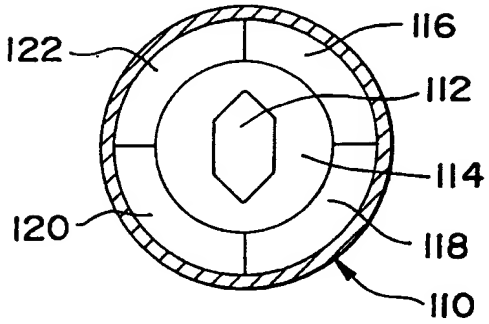


FIG. 12

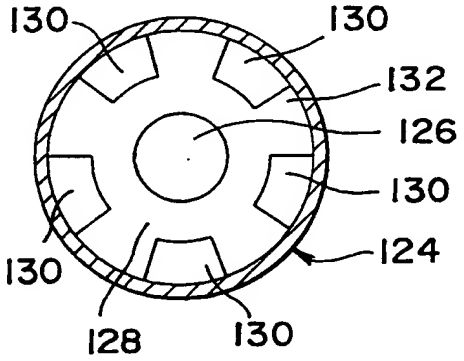


FIG. 13

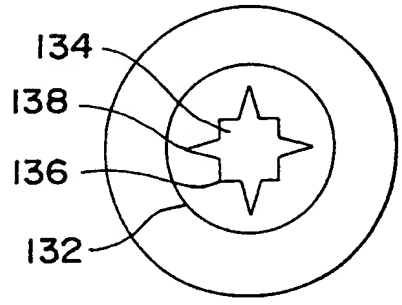
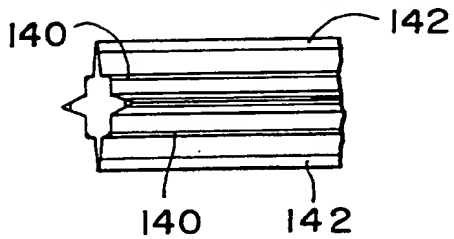


FIG. 13A



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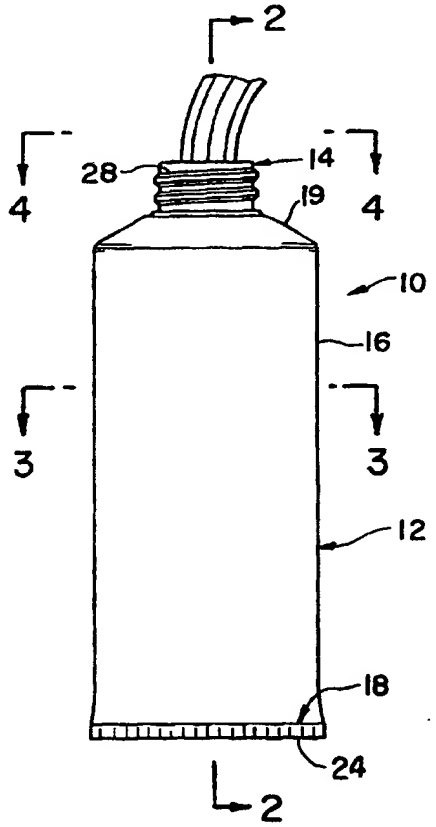
(57) Abstract

A method and apparatus for simultaneously dispensing a plurality of viscous materials, such as dentifrice pastes, produces a striped outer layer of a first material surrounding a core of a second viscous material. The apparatus (10) includes a collapsible tube or pump-type dispenser (12) containing a first viscous material (20) and a second viscous material (22) of a contrasting color in contact with the first material so that both materials are dispensed simultaneously. The tube or dispenser includes an outlet nozzle (14) having a shaped outlet (32) capable of scraping and removing a portion of the outer layer of viscous material to dispense the core material having stripes of the outer material. The nozzle is capable of forming a plurality of fine pin stripes on the core material .



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METHOD AND APPARATUS FOR DISPENSING VISCOUS MATERIALS

FIELD OF THE INVENTION

The present invention is directed to a method and apparatus for simultaneously dispensing at least two different viscous materials. More particularly, the invention is directed to a method and apparatus for dispensing two different viscous materials to form an extrudate having a plurality of longitudinal stripes of one of the viscous materials.

BACKGROUND OF THE INVENTION

Containers such as collapsible squeeze tubes have been used to dispense simultaneously at least two different materials. It is desirable to package the materials so that when dispensed, the different materials appear as longitudinal stripes in the extrudate. Several containers and methods for dispensing the materials have been developed.

Many of the containers for dispensing different viscous materials include containers having separate compartments or a second container disposed within a first container where each compartment or container contains a different material. These devices typically include a dispensing nozzle having separate channels to simultaneously dispense the materials from each compartment or container. These devices, although effective, are expensive to manufacture. In addition, these dispensing containers are difficult to fill and generally require complex filling nozzles. Examples of these types of containers are disclosed in U.S. Patent No. 4,211,341 to Weyn, U.S. Patent No. 3,175,731 to Ellman and British Patent No. 209,920.

Other forms of containers for dispensing two different materials include a single tube such as that disclosed in U.S. Patent No. 3,747,804 to Raaf et al. In this device the first material is placed in one end of the tube with the second material being placed in the discharge end of the tube. A dispensing nozzle is attached to the discharge end of the tube. The nozzle includes a collar extending into the tube such that a main channel leads to the first material in the lower end of the tube and a secondary channel leads to the second material in the discharge end. Pressure applied to the tube causes the two materials to be simultaneously dispensed through the nozzle. This type of dispensing is referred to as "pointing" the striping material onto a core of a base material. Another form of this type of device is disclosed in U.S. Patent No. 4,826,044.

Still another form of dispensing device for simultaneously dispensing two different materials is disclosed in GB 2142611A. This patent shows a filling nozzle for filling a tube with two dissimilar materials arranged so that a main body of material can be dispensed from the tube with longitudinal stripes of one of the dissimilar materials. The two materials fill the tube to form a core of the first material and a plurality of streams of the striping material extending along the interior of the tube walls. This type of filling is sometimes referred to as deep striping. In this type of container, when each of the two dissimilar materials have a similar rheology, the two materials can be dispensed simultaneously through a single nozzle to form a core of the first material with stripes of the second material.

Each of these dispensing devices are effective in dispensing two different materials. While several of these devices are capable of dispensing a core of one material and longitudinal stripes of a second material, the dispensers are limited to the size of the striping which can be produced. The rheology of the material is generally such that the ratio of the two materials within the container must be within a certain range. In particular, with deep

striping, the striping material must be provided in a certain amount to be dispensed with the core material. As a consequence, the dimensions of the striping must be of predetermined width and depth to dispense effectively. Furthermore, as the dimensions of the striping material within the tube decrease, the definition of the striping in the dispensed material decreases.

There is, therefore, a continuing need in the art for a dispensing device capable of dispensing two dissimilar materials to produce a core of one material having narrow striping of a second material. There is further a need in the art for a dispensing device capable of dispensing two or more materials to form a shaped extrudate.

Summary of the Invention

The present invention is directed to a method and apparatus for dispensing simultaneously two or more viscous materials. The invention is further directed to a dispensing device for dispensing two or more different materials to form an extrudate having a predetermined geometric shape with selected portions of the extrudate being formed from the different materials. Accordingly, it is a primary object of this invention to dispense viscous materials such as a dentifrice paste or gel in such a manner to form a core or base of a first material having stripes of a second material. In preferred embodiments of the invention, the dentifrice comprises two or more dissimilar materials of contrasting colors. The stripes may be formed as longitudinal or spiral stripes.

These and other objects of the invention are basically attained by providing a dispensing container or tube with a dispensing nozzle having a geometric-shaped dispensing outlet. In preferred embodiments, the dispensing outlet is a polygon-shaped opening having a plurality of radially disposed points. The container is provided with two or more dissimilar materials having compatible rheologies so that each of the materials are dispensed simultaneously at a desired rate. The materials are plac d in the same

container in designated regions such that the materials are in contact with each other. In one embodiment, two dissimilar materials are filled in a tube such that one of the materials forms a core and the second material defines longitudinal stripes. Generally, the stripes are formed on the peripheral edge of the tube so that when the materials are dispensed, the dispensed material appears as longitudinal stripes. In alternative embodiments, the dissimilar materials are arranged as a central core and one or more outer annular layers. In preferred embodiments, each of the dissimilar materials are disposed in areas extending longitudinally to the container such that the materials extend substantially the full length of the container.

The dispensing outlet in the container is capable of shaping the materials as they are dispensed. Preferably, the radial points of the outlet are positioned to coincide with the stripes of the material in the container. As the materials are dispensed from the container through the dispensing nozzle, the radial points of the outlet essentially scrape and restrict the flow of the striping material as it is dispensed to form small and narrow stripes. The dispensing outlet may be a number of different shapes including, for example, a star shape, triangle shape, square shape or slot shape.

In one preferred embodiment, the dispensing outlet is a star shape. The container includes a plurality of stripes of one of the materials corresponding to the number of points of the star and are positioned in the container to align with the points of the star. As the materials are dispensed through the nozzle, the points of the star shape the extrudate so that the extrudate has a substantially star-shaped cross section with the tips of the star being formed from the striping material.

These and other objects and salient features of the invention will become apparent from the following detailed description which, when taken in conjunction with the drawings, discloses several preferred embodiments of the invention.

Brief Description of the Drawings

Referring to the drawings which form part of this original disclosure in which:

Figure 1 is an elevated view of the container in accordance with a preferred embodiment of the invention;

Figure 2 is a cross-sectional view of the container taken along lines 2-2 of Figure 1;

Figure 3 is a cross-sectional view of the container taken along line 3-3 of Figure 1;

Figure 4 is an elevated end view of the dispensing nozzle in a first embodiment of the invention, and Figure 4A is a perspective view of the material having been dispensed from the nozzle of Figure 4, showing a star shape with the tips of the star having longitudinal stripes;

Figure 5 is an elevated end view of a dispensing nozzle in a second embodiment of the invention, and Figure 5A is a perspective view of the material having been dispensed from the nozzle of Figure 5 showing a plurality of fine longitudinal stripes;

Figure 6 is an elevated end view of the dispensing nozzle in a third embodiment of the invention, and Figure 6A is a perspective view of the material having been dispensed from the nozzle of Figure 6 showing the longitudinal stripes;

Figure 7 is an elevated end view of a fourth embodiment of the invention, and Figure 7A is a perspective view of the material dispensed from the nozzle of Figure 7 showing the two longitudinal stripes;

Figure 8 is a cross-sectional view of a container in a further embodiment of the invention showing the two different materials in the container arranged to form longitudinal stripes;

Figure 9 is an nd view of the dispensing nozzle in a further embodiment, and Figure 9A is a perspective view of the material dispensed from the nozzle showing the longitudinal stripes;

Figure 10 is a cross-sectional view of the container in a further embodiment showing the different materials arranged as concentric annular columns, and Figure 10A is a perspective view of the material having been dispensed and showing the annular stripes;

Figure 11 is a cross-sectional view of the container in a further embodiment showing the materials arranged as a center core, a middle annular core, and an outer annular core divided into four wedge-shaped columns of different colors;

Figure 12 is a cross section of a further embodiment of the container showing a center core and an outer core where the outer core includes five spaced apart longitudinal columns of different materials;

Figure 13 is an end view of the dispensing nozzle in a further embodiment showing a dispensing outlet having a plurality of alternating long and short radial legs, and Figure 13A is a perspective view of the material dispensed from the nozzle of Figure 13.

Detailed Description of the Invention

The disadvantages and limitations of the previous dispensing devices are overcome by the present invention, while providing an efficient and inexpensive dispensing device for dispensing the materials in a predetermined geometric shape having longitudinal stripes. The invention is primarily directed to a container for dispensing viscous materials, and in particular, paste or gel dentifrices. Referring to Figure 1, the dispensing device 10 comprises a container 12 for containing a viscous material and a dispensing nozzle 14.

The container 12 may be any suitable container capable of dispensing viscous materials, and in particular for dispensing a dentifrice paste or gel. The

container may be a thin-walled collapsible tube or a rigid container having a conventional pump or other mechanical dispensing apparatus. In preferred embodiments, the container is a squeeze tube made of a synthetic, multilayer plastic material such as nylon, polyethylene, polypropylene, ethylene vinyl alcohol, polyesters, and the like. The preferred containers include an inner barrier layer to prevent adsorption of flavor components or other unstable components in the viscous material. In the embodiment of Figures 1 and 2, the container 12 is a collapsible tube having a cylindrical side wall 16 with a closed bottom end 18 and a tapered collar 19 at the upper end, coupled to the dispensing nozzle 14. In the embodiment of Figures 1 and 2, the dispensing nozzle 14 is integrally molded with the sidewall of the container, although in alternative embodiments the nozzle may be molded separately such as by injection molding, and attached to the tube by conventional means.

In the embodiment of Figures 1-3, the container is filled with two dissimilar materials. As shown in Figures 2 and 3, a first viscous material 20 defines a core centered axially in the tube 12 and extending substantially the full length of the tube. A second viscous material 22 surrounds the core 20 in the form of an annular column and also extends the full length of the tube. The viscous materials are injected into the tube from the bottom end using a conventional coaxial filling nozzle as known in the art. The tube is then closed at the bottom end by crimping at 24 as shown in Figure 1.

The dissimilar viscous materials 20, 22 in preferred embodiments are dentifrice compositions. As used herein, the term dissimilar materials is intended to refer to materials which differ in texture, composition, and particularly color. For example, the viscous materials may be an opaque dentifrice paste, a colored paste, or a translucent or clear gel. The viscous materials may also contain colored flakes, speckles or other colored bodies to enhance the aesthetic appearance of the material. In preferred embodiments, the container 14 contains at least two dissimilar compositions having

contrasting colors. For example, in the embodiment of Figures 1-3, the first core material may be a white or pigmented paste ,and the outer material may be a colored gel of a contrasting color.

The rheology of each of the dissimilar materials are compatible with each other so that the compounds are dispensed simultaneously from the dispensing container. It is desirable to have the dissimilar materials with similar rheologies so that each material can be dispensed at the same rate. The actual dispensing rate of the materials will depend in part on the volume of each material in the container and the shape and dimensions of the dispensing outlet. The materials further have flow characteristics and slump properties to be easily dispensed from the container and retain the extruded shape for a sufficient length of time, typically about 60 seconds.

The preferred dentifrice compositions are conventional formulations as known in the art. Typical dentifrice compositions include a gelling agent, a humectant, polishing material, a surfactant, and a fluoride-providing compound. One example of a clear dentifrice comprises sodium monofluorophosphate, glycerine, sorbitol, and amorphous silica. Suitable dentifrice compositions are disclosed in U.S. Patent No. 4,374,823; U.S. Patent No. 4,375,460; U.S. Patent No. 4,467,921; and U.S. Patent No. 4,456,585.

The dispensing nozzle 14 is in the form of a collar 26 extending axially from the upper end of the tube. In preferred embodiments, the collar 26 includes external threads 28 for coupling with a standard screw cap (not shown). The nozzle 14 includes a lip 30 extending radially inward from the outer edge to define the dispensing outlet 32.

The dispensing outlet 32 is shaped and dimensioned to shape the dentifrices or other viscous materials as the materials are dispensed. The outlet 32 and the lip 30 are also dimensioned to cooperate with the dissimilar materials within the tube to shape at least one of the materials to produce a striped pattern of the second material on the core material. As shown in the

embodiment of Figures 2 and 3, the container 12 contains two dissimilar materials arranged concentrically. The outer material 22 is forced upwardly through the collar 26 simultaneously with the core material 20. As shown in Figure 2, the lip 30 is dimensioned to cooperate with the outer material 22 to control the amount of the material 22 being dispensed through the dispensing outlet 32 in relation to the amount of the core material 20 being dispensed. The dispensing outlet is shaped to scrape a portion of the outer material 22 from the core material 20 and restrict the flow of the outer material to produce a striped pattern of the outer material 22 on the core material 20.

In preferred embodiments, the core material and the striping material are disposed in longitudinal areas of the container and extend the full length of the container while being in continuous physical contact with each other. Both materials are dispensed simultaneously by passing through an outlet and dispensing nozzle.

The dispensing outlet 32 may be any shape capable of shaping the core material 20 and the outer material 22. In preferred embodiments, the dispensing outlet 32 is a polygon-shaped opening having a plurality of substantially straight sides to define a plurality of radial points. In the embodiment of Figures 1-4, the dispensing outlet 32 is a star-shaped opening. The star-shaped opening as shown in Figure 4 is formed by side edges 34 which define radial points 36 of the star and troughs 38 between the points 36.

The two dissimilar materials 20 and 22 are dispensed simultaneously through the star-shaped opening to form a star-shaped extrudate 39 as shown in Figure 4A. The radial distance between the troughs 38 and the points 36 of the star-shaped outlet 32 is selected to define the pattern of the dissimilar materials as they are dispensed. In the embodiment of Figure 4, the troughs 38 of the star-shaped opening extend inwardly a sufficient distance to remove a portion of the outer material 22 from the core material 20 while dispensing the materials so that the trough 40 of the star-shaped extrudate are formed from the

core material 20. The points 36 of the star-shaped openings are positioned to allow a predetermined amount of the outer material 22 to be dispensed as points 42 of the extruded star which appear as longitudinal stripes as shown in Figure 4A. In preferred embodiments, the points 42 of the star-shaped outlet are aligned with the inner wall of the collar 26. This embodiment is referred to as the stars and stripes embodiment.

The position and dimension of the longitudinal stripes 42 of the extrudate can be controlled by the shape and dimension of the dispensing outlet, the placement of the dissimilar materials in the container, and the respective amounts of each material. The angle of the sides 34 with respect to each other which define the points of the star can be varied to control the width and depth of the stripes on the core. For example, a larger angle between the sides will produce wide stripes in the extruded material. In a similar manner, a small angle between the sides of the star will produce a fine, narrow pin stripe which is generally deeper than the stripes formed by the wider-angled sides. The polygon-shaped outlet is able to produce a plurality of fine stripes of one of the viscous materials without loss of definition which cannot be produced by filling the container with stripes or columns of the dissimilar materials and dispensing the materials through a standard annular outlet.

In a further embodiment illustrated in Figure 5, the dispensing nozzle 44 includes a dispensing outlet 46 having a plurality of side edges 48 defining a substantially serrated outlet. In this embodiment, it is desirable to fill the container with two dissimilar materials as concentric columns in the manner shown in Figures 2 and 3. The side edges 48 converge to define a plurality of alternating troughs 50 and points 52. The viscous materials are dispensed through the serrated outlet so that the troughs 50 remove a portion of the outer annular layer of material to expose the core material. The outer annular mat rial is similarly dispensed through the points 52 to produce an extrudate

having a plurality of fine stripes of the outer material on a core of the inner material as shown in Figure 5A.

In a further embodiment shown in Figures 6 and 6A, the dispensing nozzle 54 includes a triangular-shaped dispensing outlet 56. In a similar manner as in the embodiments of Figures 1-5, the points 58 of the triangular-shaped dispensing outlet 56 produce a triangular extrudate 60 having the points 62 of the extrudate formed from the outer material. Figures 7 and 7A show a further alternative embodiment where the nozzle 64 includes a dispensing outlet 66 in the shape of an elongated slot. The viscous materials are dispensed from the outlet 66 in the form of strip 68 having longitudinal stripes 70 along the outer edges.

In a further embodiment illustrated in Figure 8, a tube 72 is filled with a core material 74 and columns of a striping material 76 disposed around the outer peripheral edge. The striping material forms longitudinal stripes or columns in the container. The two dissimilar materials are dispensed through the nozzle simultaneously. This arrangement of the two dissimilar materials is typically referred to as deep striping. A dispensing nozzle 78 as shown in Figure 9 includes a four-point star-shaped dispensing outlet 80. The outlet 80 includes a plurality of side edges 82 defining the points 84 and troughs 86 of the star. The striping material 76 is positioned in the tube to be aligned with the points 84 of the star-shaped outlet as shown by phantom lines in Figure 9.

The arrangement of the core material 74 and the striping material 76 in the tube 72 allow the materials to move through the dispensing nozzle 78 as a column of the core material 74 with stripes of the striping material 76 until the materials reach the dispensing outlet 80. As the materials pass through the dispensing outlet 80, the troughs 86 of the outlet 80 shape the materials to form the extrudate 88 into a star shape where the troughs 90 of the extrudate are formed from the core material. The points 84 of the outlet 80 shape the striping material 76 to form th points 92 of the extrudate as shown in Figure 9B.

In a further alternative embodiment shown in Figure 10, the tube 94 contains four dissimilar viscous materials 96, 98, 100 and 102 arranged as concentric annular columns. The four materials may be dispensed through a nozzle as in Figure 9A to produce an extrudate 106 having a star shape where the arms 108 of the star are made up of the four materials such that each material is visible.

Numerous arrangements and any number of dissimilar materials may be used to produce different effects in the extrudate. It is particularly desirable to use materials having contrasting colors. For example, in a further embodiment illustrated in Figure 11, the tube 110 contains six dissimilar materials. In this embodiment, a core material 112 is surrounded by an annular column 114 of a clear material. An outer annular layer being made up of four arcuate columns 116, 118, 120 and 122 surround the column 114. These materials may be dispensed through a dispensing outlet as in Figure 9 to produce a star-shaped extrudate having each of the arms making up the star formed from one of the dissimilar materials. The body of the star being formed from the transparent material 114 allows the core material 112 to be visible.

In a further embodiment illustrated in Figure 12, a tube 124 contains three dissimilar materials. A core material 126 of a first color is surrounded by an annular column 128 of a second material having a second color. Five spaced apart columns 130 of a third material of a third color are arranged around the peripheral edge of the second material 128. These materials may be dispensed in cooperation with a dispensing outlet as shown in Figure 4 with the points of the stars aligned with the space 132 between the columns 130. When dispensed, the body of the star-shaped extrudate will be formed from the core material 126 with the sides of the arms of the star formed from the material 128 and the tips of the star formed from the third material 130.

In a furth r embodiment of the invention shown in Figure 13, the dispensing nozzle 132 includes a dispensing outlet 134 having a star-like

shape defined by alternating short peaks 136 and long peaks 138. When two materials are arranged as concentric columns as shown in Figure 3, the dispensed materials produce a star-shaped extrudate having narrow stripes 140 formed by the short peaks 136 and dominant, broad stripes 142 formed from the long peaks 138.

It will be recognized that various arrangements and shapes of the dispensing outlet and the materials in the container can be made. In one embodiment, the outer material can be a colored translucent material or transparent material having colored bodies therein which can be dispensed as a thin layer on the core material so that the core is also visible.

Numerous other embodiments can be produced to form an extrudate having a desired shape and number of longitudinal stripes. By filling the container with two or more dissimilar materials and dispensing the materials through the polygon-shaped outlet, the position and dimension of the striping can be controlled. While several embodiments have been illustrated, it will be apparent to one skilled in the art that numerous alternative embodiments can be envisioned without departing from the scope of the invention as defined in the following claims.

WHAT IS CLAIMED IS:

1. A dispensing device comprising

a container containing a first viscous material axially disposed in said container, and at least one second viscous material axially contacting said first viscous material; and

dispensing means on said container for shaping said first and second viscous material as said first and second materials are being dispensed, and for dispensing said second material in a controlled amount with respect to the amount of said first material.

2. The device of claim 1, wherein said first and second material have contrasting colors and viscosities so that each material is simultaneously dispensed from said container as an inner core of said first material and an outer layer of said second material.

3. The device of claim 1, wherein said dispensing means includes means for removing a portion of said second material while dispensing said first and second materials as an inner core of said first material and at least one stripe of said second material on said core.

4. The device of claim 3, wherein said removing means comprises an inwardly extending lip having an orifice, said orifice having a polygonal shape.

5. The device of claim 4, wherein said orifice is a star shape.

6. The device of claim 4, wherein said orifice includes a serrated inner edge.

7. The device of claim 4, wherein said orifice includes a plurality of arms defining a trough between each of said arms, each of said troughs being disposed to shape said second material so that said second material is dispensed only through said arms of said orifice.

8. The device of claim 1, wherein said first material is contained in said container as a core and said second material is contained in said container surrounding said core.

9. The device of claim 1, wherein said first material is contained in said container as a core and said second material is contained in said container as a plurality of columns disposed longitudinally with respect to said container and extending substantially the length of said container, said columns being arranged radially around said core.

10. The device of claim 1, further comprising a third viscous material, said first, second and third viscous materials being contained in said container as concentric annular layers.

11 The device of claim 1, wherein said container is a collapsible squeeze tube.

12. The device of claim 1, wherein said first material is centrally disposed in said container and said second material surrounds said first material, said container including a third material in a plurality of columns disposed in said second material.

13. The device of claim 1, wherein said dispensing means includes a dispensing nozzle having a polygonal shaped outlet, said outlet having a plurality of alternating first and second arms extending radially outward from an axial center of said container, wherein said first arms have a radial length greater than said second arms so that said device dispenses said viscous materials to dispense a first stripe of second material on said core through said first legs and to dispense a second stripe of said second material on said core through said second arms, said second stripe having a narrower width than said first stripe.

14. The device of claim 1, wherein said first material is disposed in said container as a central core, said second material is disposed to surround said core and said container further includes a plurality of columns of a third material disposed radially around a perimeter of said second material.

15. A method of dispensing viscous materials comprising

providing a container having a core of a first viscous material and a second viscous material surrounding said core; and

dispensing said first and second materials simultaneously through dispensing means, said dispensing means including shaping means for shaping only said outer layer to form a plurality of stripes on said first material.

16. The method of claim 15, wherein said shaping means forms a column of said materials and includes means for removing a portion of said second material from said column during dispensing to expose at least a portion of said core.

17. The method of claim 15, wherein said shaping means includes a dispensing outlet, said outlet having a serrated inner edge whereby said dispensing of said first and second materials produces a core of said first material and a plurality of stripes of said second material on said core.

18. The method of claim 16, wherein said shaping means includes a dispensing star shaped outlet.

19. The method of claim 16, wherein said shaping means includes a dispensing outlet having a polygonal shape.

20. The method of claim 16, wherein said shaping means includes a dispensing outlet having an elongated slot for dispensing said first and second materials.

21. The method of claim 19, wherein said dispensing outlet includes a plurality of alternating first and second arms, said first arms having a radial length greater than the radial length of said second arms, said method comprising dispensing said materials through said dispensing outlet and producing an extrudate having a plurality of first longitudinal stripes formed from said first arms and a plurality of second longitudinal stripes formed from said second arms.

FIG. 1

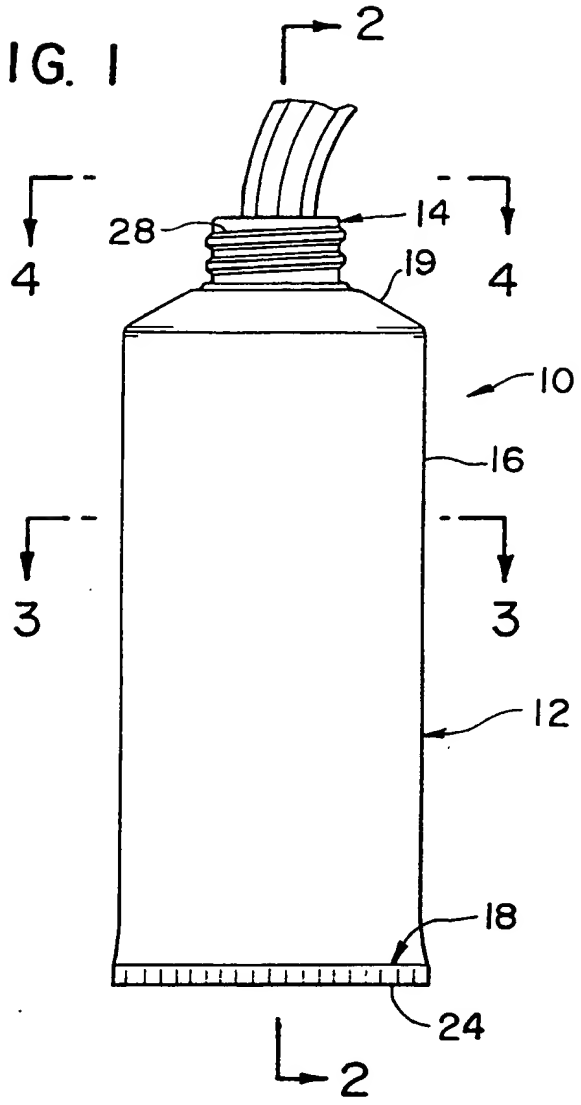


FIG. 3

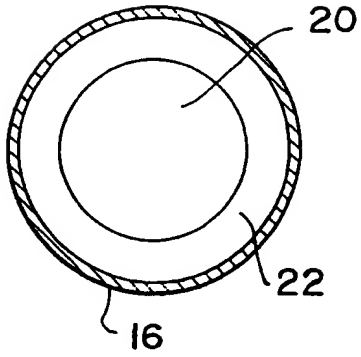


FIG. 2

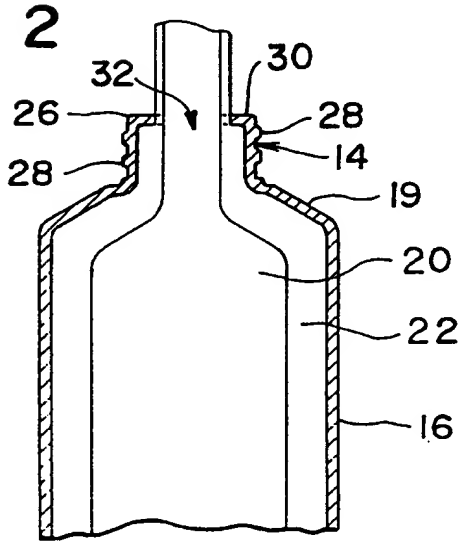


FIG. 4

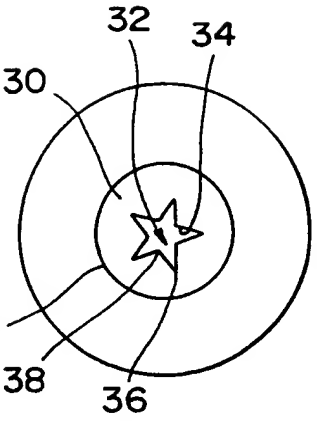


FIG. 4A

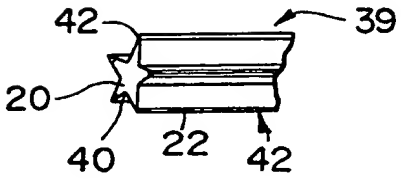


FIG. 5

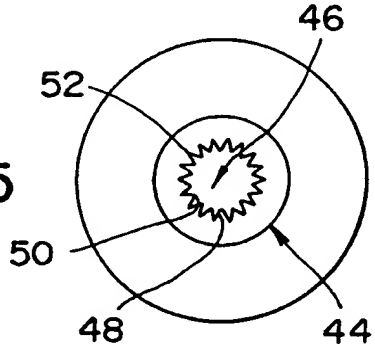


FIG. 5A

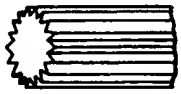


FIG. 6

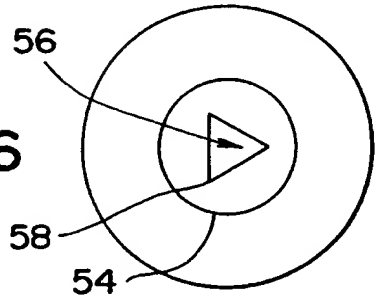


FIG. 6A

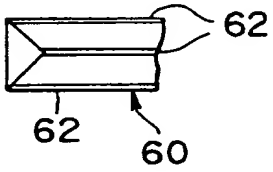


FIG. 7

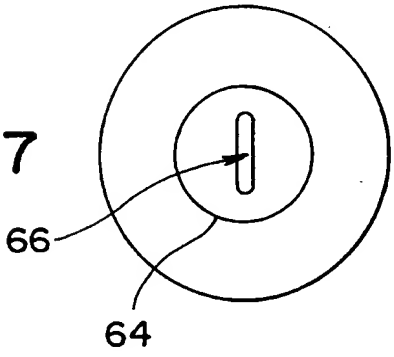
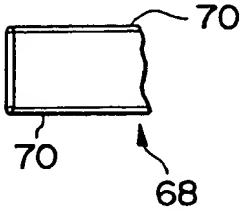


FIG. 7A



INTERNATIONAL SEARCH REPORT

Interna nal Application No
PCT/US 94/05145

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 B65D35/24

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 5 B65D A23G A23P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB,A,1 123 075 (STERWIN AG) 14 August 1968 see the whole document	1-4,11, 15,16, 19,20
A	GB,A,2 161 863 (REALEX CORP.) 22 January 1986 see abstract; figures	1,2,8, 10,11,15
A	FR,A,2 243 120 (CEBAL) 4 April 1975 see figures	1-5,11, 15,16,18

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
12 September 1994	20.09.94
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax (+ 31-70) 340-3016	Authorized officer Gino, C

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INTERNATIONAL SEARCH REPORT

...formation on patent family members

Intern ...al Application No
PCT/US 94/05145

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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		AU-A-	3890185	23-01-86
		CA-A-	1305949	04-08-92
		DE-A,C	3507134	23-01-86
		FR-A-	2567490	17-01-86
		JP-A-	61033963	18-02-86
		US-A-	4715518	29-12-87
FR-A-2243120	04-04-75	NONE		